



Department of Pesticide Regulation



Paul E. Helliker
Director

MEMORANDUM

Gray Davis
Governor
Winston H. Hickox
Secretary, California
Environmental
Protection Agency

TO: Sue Edmiston, Ag. Supervisor III
Worker Health and Safety Branch

HSM-02019

FROM: Janet Spencer, Associate ERS
Worker Health and Safety Branch

DATE: July 16, 2002

SUBJECT: WH&S BRANCH ACTIVITIES RELATED TO PROJECT 0203 (34-MON-02)

Incident Chronology

On June 1, a crew of approximately 20 workers tying and suckering vines in a young vineyard smelled a pesticide odor and developed symptoms of nausea, headache, weakness, numbness and blisters in the mouth and lips, and sore knees (joints) in a suspected drift incident in Monterey County. At least one worker experienced vomiting. At least 19 workers sought medical treatment on June 1, with several receiving follow-up care on June 2. Due to the number of workers, it took approximately 6 hours for all of them to receive treatment on June 1. Details of the medical treatment will be reviewed after records are released to the Monterey CAC. At present, it is known that medical providers instructed all the workers to go home, bathe, and launder their work clothing. Some workers received medications and/or had blood drawn for analysis of cholinesterase. Some workers lost time from work due to disability. Some workers' symptoms persisted until June 4.

The Monterey County Agricultural Commissioner's office (CAC) and DPR's Central Regional Office were informed of the incident at approximately 4:30 PM on June 3. Worker Health and Safety (WH&S) was informed of the incident at approximately 8 AM on June 4. Three WH&S staff (Janet Spencer, Bernie Hernandez and Michel Smith) were dispatched to Monterey County at approximately 10 AM on June 4. The King City Branch Office was collecting samples and conducting worker interviews on-site at the time. WH&S conducted a parallel investigation of the incident in cooperation with Monterey CAC staff and their staff in King City, who provided us with maps, pesticide application records, and other pertinent information. WH&S staff also collected DFR samples and conducted several worker interviews.

On-site Investigation

The incident site, owned by Zabala Vineyards, is at the SE corner of Thorne Road and Los Coches Road. On the morning of the incident, the workers, employed by Agri Labor Services, began tying and suckering vines in block PN01 at approximately 7 AM. Block PN01 is the southernmost block of the vineyard. The majority of the workers were working their way north from the SE end of block PN01; one worker was planting at the north end of the block. No pesticides had been applied to block PN01 during 2002. Maps of the site are attached.



At the time of the incident, it was overcast and possibly a bit foggy. The wind was blowing from the NW at approximately 5 mph and increasing steadily in velocity (CIMIS data from station 114, Arroyo Seco - Monterey Bay- station 114). At approximately 7:30 AM, an electrostatic ground application commenced in the northern part of a block of young grapes owned by Ventana Vineyards, located approximately 3/8 mile NW of the workers, and across Los Coches Road (application site). The applicator was moving south. The tank mix applied included wettable sulfur, myclobutanil, and bacillus thuringensis (Bt). This was the first pesticide application of the season to the application site.

Within minutes, the crew smelled an odor and developed the symptoms listed above. The workers noticed the ground application was underway, but none of the workers observed either a cloud of pesticide drifting toward them, nor did any workers experience direct contact with pesticide mist. They complained about their symptoms at approximately 8 AM, and were moved approximately 1/2 mile NE, to the eastern edge of block PN04. Several workers continued to smell a pesticide odor at block PN04. The workers entered block PN04 and began tying a few vines, but, as their symptoms persisted, they ceased working at approximately 8:15 and were taken to an urgent care facility at approximately 9 AM.

At the same time, SoilServ was making an aerial application to broccoli raabe in block 42 of Ranch 10, owned by D'Arrigo Brothers Co., between 1/2 - 3/4 mile directly north of the ground application and, again, due NW of the workers. A few workers observed the aerial application prior to being moved to block PN04, and all of them noticed the aerial application taking place when they were re-located to block PN04. The broccoli raabe was treated with a tank mix of imidacloprid, gibberellic acid, spinosad, neem oil, mefenoxam, and cypermethrin.

While no visible drift was observed or felt, possible contributing factors include the following:

- Young vines in both the Ventana and Zabala Vineyards provided little impediment to potential drift.
- The wind was blowing directly from the NW, and both the ground and aerial applications took place to the NW of the workers.
- Overcast conditions and the possible presence of light fog may have limited aerosol movement to ground level.

Sampling

On June 4, WH&S staff collected four DFR samples from the treated foliage in Ventana Vineyards and six DFR samples from the area the workers were originally working, in the southern part of Zabala Vineyards, block PN01. Staff also took digital photos of these two sites, which are presented below. A worker also relinquished a jacket she had been wearing during the incident, which had lain unattended in her vehicle since the incident, three days prior. The DFR and clothing samples were submitted for analysis of sulfur, myclobutanil and Bt residues. These

samples and whole leaf samples collected by the CAC earlier the same day were submitted to the CDFA Center for Analytical Chemistry at approximately 2 PM on June 5. At the time the samples were submitted, the identity of the pesticides being applied by air was not known. Thus, the samples were submitted to the Worker Health and Safety lab for analysis of the pesticides known to have been present in the ground application to the incident site (sulfur and myclobutanil). The samples were not analyzed for Bt as the Laboratory does not conduct analyses of microbiologicals. The whole leaf samples were submitted to the Residue lab.

Photos of Ventana Vineyards (Application Site) and Zabala Vineyards (Incident Site)
June 4, 2002



Ventana Vineyards (Application Site)
Site of the ground application of sulfur, myclobutanil and Bt on June 1, 2002. Photo taken looking E across Los Coches Road. Incident site is approximately ¼ mile SE.



Zabala Vineyards, Block PN01
(Incident Site) – Site where workers were tying and suckering vines when they became ill on June 1, 2002. Photo taken looking SE to the southernmost edge of block PN01.

On June 5, WH&S collected two additional DFR samples from the northern part of block PN01, upon learning that a worker who had been working in that area at the time of the incident had subsequently developed fairly severe and persistent symptoms. The samples were submitted to the Worker Health and Safety lab at approximately 9 AM on June 6. Since the identity of the pesticides applied by air was now known, the samples were submitted for analysis of the pesticides reportedly present in both the ground and aerial tank mixes. The Worker Health and Safety lab conducted analyses for residues of myclobutanil, sulfur, imidacloprid, spinosad and cypermethrin, and mefenoxam. Gibberellic acid and neem oil analyses were not feasible due to extremely low recoveries and multiple analytical interferences.

DFR sample results are provided in Table 1. Sulfur was detected on all samples. No other residues were detected on the DFR samples. The jacket contained 110 µg of myclobutanil. Myclobutanil was not detected on any DFR samples.

Table 1. Project 0203: Dislodgeable Foliar Residues (µg/cm² sulfur) Detected on Grape Foliage Collected from the Application Site (Ventana Vineyards) and Incident Site (Zabala Vineyards) *(Illness incident occurred on June 1, 2002. Samples were collected June 4^a-5^b, 2002)*

Sample Location and Number	µg/cm² sulfur
Ventana Vineyards	
MT34-0201 ^a	1.78
MT34-0202 ^a	1.81
MT34-0203 ^a	6.26
MT34-0204 ^a	5.36
Mean	3.80
Standard Deviation	2.05
Zabala Vineyards, Block PN01	
MT34-0205 ^a	0.03
MT34-0206 ^a	0.02
MT34-0207 ^a	0.04
MT34-0208 ^a	0.03
MT34-0209 ^a	0.06
MT34-0210 ^a	0.05
MT34-0211 ^b	0.07
MT34-0212 ^b	0.03
Mean	0.04
Standard Deviation	0.02

Interviews

King City CAC staff conducted extensive interviews on June 4. WH&S staff participated with CAC staff in interviewing several workers on June 5. All the workers were Spanish speaking; CAC staff Jesus Ramirez interpreted for WH&S. We interviewed four individuals, the crew foreman, the crew supervisor, a woman who was unavailable for interview the day prior, the worker who was planting vines in the northern part of block PN01, and the woman who submitted her jacket for analysis.

Crew Foreman

The foreman coordinates and oversees several crews and was not in the field with the affected crew at the time of the incident. He provided details about where the crew located and where and when they were moved when workers began feeling ill. He said the crew has been planting, tying, training young vines and lifting wires in Zabala Vineyards for the past few weeks and that no one had been ill in the days prior to the incident.

Crew Supervisor

She provided us with qualitative information on the weather conditions at the time of the incident. The first worker to report feeling ill complained of numbness in the lips and mouth. She then told the crew that if anyone was feeling ill, they could stop working. At this point, the crew noticed the ground application to the NW. She said no one noted any drift or mist coming from the ground application. She called the crew foreman, who moved the crew to block PN04. As they began working in the vines, more workers began reporting symptoms to her. They observed the aerial application taking place to the NW at this time. Some workers continued to note an odor. She removed the crew from the vineyard and the workers were subsequently taken to the urgent care facility.

Worker 1

She was unavailable for Jesus Ramirez to interview on June 4, as she had gone home due to continuing symptoms. She lost a total of 1.5 work days due to her illness. She was wearing clothing typical of all the female workers in the crew: 2 shirts (or jacket and shirt), long pants, shoes and socks, nylon knit picker gloves, baseball (or straw hat) and 3 bandanas. One bandana covered her head under the hat, one was draped cape style to cover her neck and upper chest, and the third was tightly tied around her nose, mouth and chin. Only her eyes were visible.

She said that all the workers were beginning to feel ill before being moved to block PN04, but that they didn't immediately report their symptoms to their crew supervisor. She had smelled an odor for about a half hour before the crew was removed from the field. She noted a slight odor after the crew was moved to block PN04. She continued to experience nausea, dizziness, headache, and dry mouth and throat through June 4. In her two years of vineyard work, she had never experienced any other illness that she felt was related to exposure to pesticides. She received initial medical treatment which included two medications. One was too strong for her and she sought follow-up treatment on June 3.

Worker 2

He reported being the closest to the ground applications. He was planting vines in the northern part of block PN01 while the remainder of the crew was tying and suckering in the southern portion of PN01. He developed symptoms of dizziness, nausea, weakness, headache, sore knees, and blisters inside his lower lip. This latter symptom had not resolved at the time of the

interview. He had two visits to the urgent care facility, one for initial treatment on June 1, and another visit on June 2 for a blood draw.

He noted an odor at 7:30 AM, and observed the aerial application taking place. He did not observe the ground application. He noted the odor was stronger as he worked his way west in the vineyard. He did not see or feel any mist. He wore work clothing consisting of long pants, 2 shirts, (T-shirt under a long-sleeved shirt), knit picker gloves, leather boots, and a bandana under his baseball cap, which hung down to protect his neck. This clothing was typical of that worn by the male members of the crew.

Worker 3

Jesus Ramirez interviewed this worker on June 4 and she relinquished her jacket to Jesus for analysis. She reported smelling an odor, but did not see or feel any mist touch her. Based on this response, I did not anticipate high residue levels on her jacket. I advised the lab to run only a general screen for the pesticides of interest and not to put a lot of effort into chasing a detection limit.

Summary of Findings

Approximately 20 workers smelled an odor and developed symptoms of nausea, headache, weakness, numbness and blisters in the mouth and lips, and sore knees (joints) while working in a young grape vineyard in Monterey County. At least one worker experienced vomiting. All workers sought medical treatment. Several workers experienced symptoms for up to 4 days. At least one worker lost 1.5 days of work. Two applications, one by ground and one by air, were taking place approximately $\frac{3}{8}$ and $\frac{3}{4}$ miles, respectively, to the NW of the workers. The tank mix applied by ground included wettable sulfur, myclobutanil, and bacillus thuringensis (Bt). The tank mix applied by air included imidacloprid, gibberellic acid, spinosad, neem oil, mesenoxam, and cypermethrin. No one observed or felt mist from either spray operation.

DFR sample analyses confirmed the presence of sulfur on grape foliage in Zabala Vineyards block PN01 (incident field). No pesticides had been applied to block PN01 during 2002. No other pesticide residues were detected on any of the DFR samples. Sulfur was present only in the tank mix being applied by ground to the Ventana Vineyards site and was not a component of the tank mix applied by air to the D'Arrigo Bros. site. Therefore, the ground application did drift onto the field where Agri Labor Services employees were working, causing the workers to become ill. Symptoms of skin irritation are consistent with exposure to sulfur. Persons who detect odors associated with pesticide applications often experience symptoms of headache, nausea, and weakness.

The source of the myclobutanil residues detected on the worker's jacket cannot be determined. Myclobutanil was not detected on any DFR samples, including those from the application site (Ventana Vineyards). The worker reported that she had last worn the jacket on the day of the illness incident and had left it in her vehicle when the crew stopped working that day. While sample chain of custody was maintained beginning on June 4, no information is available concerning possible prior sources of pesticide contamination. In the absence of DFR data confirming the presence of myclobutanil, the jacket cannot be considered as confirmation that drift occurred.

Project Documentation

Samples from Ventana Vineyards (application site) were collected in the southernmost 40 rows, with one sample each collected from approximate row numbers 5, 15, 25 and 35. Sample numbering began with the southernmost sample (row 5). Zabala Vineyards samples (incident site) were taken from the following rows in block PN01: 16-17, 19-20, 23-24, 27-28, 34- 35, 42-43, 97-98, 101-102. Chain of custody records indicate the diameter of punch used to collect samples and the number of leaf discs collected per sample.

Project documentation, sample collection, sample labeling, handling and transport, chain of custody, and data analyses were conducted in accordance with all applicable policies, including HS-1600, Guidance for Determination of Dislodgeable Foliar Residue (2002) and the following WH&S SOPs: WHS-AD04, WHS-AR02, WHS-EQ15, WHS-FO03, WHS-FO04, WHS-FO05, WHS-FO07 and WHS-FO08. Copies of the Access[®] database and of the forms, maps and photos collected during the investigation will be archived as raw data.

Attachments

- WH&S Human Effects Incident Log
- WH&S Human Effects Incident Field summary Record
- WH&S Field Plot Map and Sample Notes
- Plot map indicating location of Ventana Vineyards and Zabala Vineyards in relationship to Thorne Rd. and Los Coches Rd.
- Map of D'Arrigo Brothers Ranch 10, indicating township, range and section
- Page one of the CIMIS hourly report for June 1, 2002 from Station 114 (Arroyo Seco – Monterey Bay)

Chart 3 WH&S Human Effects Incidents (HEI) Log

Staff Name Just Steven Date 6/4/02 Time 815

Information received from Sue Edmiston

Representing _____

Phone _____

☒ US EPA Priority Incident ☐ Human Effects Incident

County Monterey Nature of incident 19 workers in grapes exposed to potential drift on SAT 6/1/02. County warned by incident 0430 pm 6/3/02. Interviews ongoing. Nylolbutanil, Sulfur being applied to adjacent grapes by electric sprayer.

Pesticides(s) implicated Nylolbutanil, Sulfur, Bt

Potential Issues	<input type="checkbox"/> Widespread exposure	<input type="checkbox"/> Children exposed	<input type="checkbox"/> English speaking
<input type="checkbox"/> OP/Carbamate	<input type="checkbox"/> Short half-life	<input type="checkbox"/> Sensitive site	<input checked="" type="checkbox"/> Spanish speaking
<input checked="" type="checkbox"/> Drift	<input type="checkbox"/> Water issues, specify	<input type="checkbox"/> High profile, specify	<input type="checkbox"/> Other:
<input checked="" type="checkbox"/> Residue	<input type="checkbox"/> Native Amer. issues	<input type="checkbox"/> Fumigation	<input type="checkbox"/> Structural app
<input checked="" type="checkbox"/> Potential misuse	<input type="checkbox"/> Odor	<input type="checkbox"/> Media present	<input type="checkbox"/> Other issues, see above

Issues from above, field location, contacts Bill Waddle Monterey CAP. Megan Bloodworth CRO, King City office stop on site.

Persons I contacted Bill Waddle, Megan Bloodworth

Actions I took coordinated by Bernie + Michel, headed to field

Next Steps contact Bill Waddle in Salinas.

WH&S Action	Assigned to	Initials	WH&S Project No. (Not Applicable)
<input type="checkbox"/> Notification/Track			
<input type="checkbox"/> Consult			
<input type="checkbox"/> Investigate: Support			
<input checked="" type="checkbox"/> Investigate: Occup. Safety	<u>Just Steven</u>		<u>0203</u>

WH&S Human Effects Incident (HEI) Field Summary Record

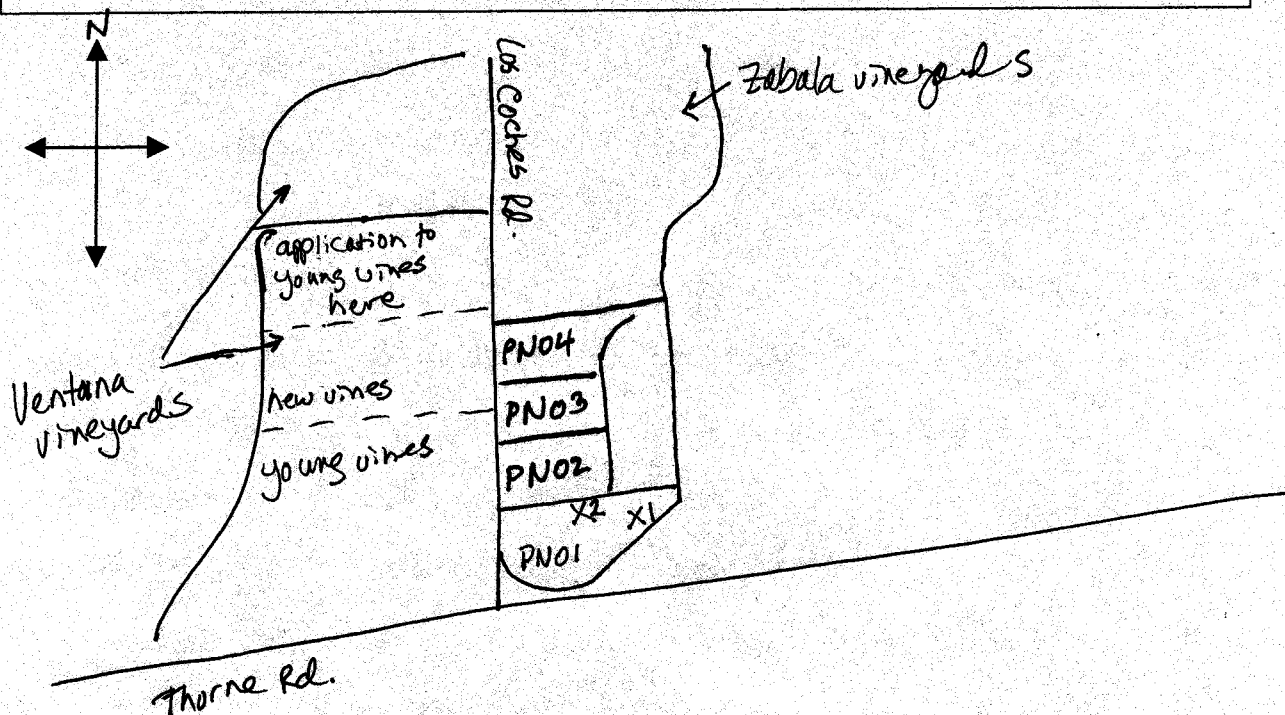
34-MON-02

Date: 6/4/02 Project No. 0203 Completed by: Agave

(Field) Location <u>thorne rd at Las Cochas. Zabala vineyards.</u>		
Crop <u>grapes</u>	Crop Maturity/Condition <u>young, 6-18" single cane</u>	
Field Condition (weeds, muddy, pests, etc.) <u>clean, drip irrigated. ventura grapes also young, but 2 canes, each 2-4 feet long.</u> <u>Ventura vineyard = app site. Zabala vineyard = drift site</u>		
Did field conditions contribute to hazard? <u>yes - young vineyards, limited canopy.</u>		
Weather during event <u>cool, slightly foggy, overcast. winds @ 5 mph</u>		
Other applicable conditions		
Did these conditions contribute to hazard?		
Samples Collected	Number, Type	Locations/other information
<input checked="" type="checkbox"/> DFR	<u>4 in Ventura</u> <u>6 on 6/4/02 in Zabala</u> <u>2 on 6/5/02 in Zabala</u>	<u>know see plot map</u> <div style="text-align: center;">↓</div>
<input type="checkbox"/> Urine		
<input type="checkbox"/> Wipes		
<input checked="" type="checkbox"/> Clothing	<u>1 jacket</u>	<u>retrieved from vehicle 6/4/02</u>
<input type="checkbox"/> Air		
<input type="checkbox"/> Other:		
Describe work tasks <u>trimming, tying, new vines. Some planting.</u>		
Did task performance or workplace hazards contribute to incident? <u>No.</u>		
Describe equipment <u>electrostatic sprayer</u>		
Did equipment/malfunction contribute to hazard? <u>unknown</u>		
Are mitigations appropriate? Describe:		

WH&S Field Plot Map and Sample Notes

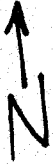
Entries made by: <i>Janet Speven</i>	Date <i>6-6-02</i>	WH&S Project No. <i>0203 34-MON-02</i>
Location <i>Monterey County, 15 mi N of King City, 101 S exit at Thorne Rd.</i>		



Sampling Notes

X1 = majority of workers felt ill here. Workers moving N.
X2 = single worker working closest to the ground app in Ventana vineyards.
Workers ~ 3/8 mile SE of app. Wind ~ 5 mph from NW
4 sp's taken in app vineyard MT34-0201 thro -0204 on 6/4/02
6 sp's taken in ~~app~~ area ^{X1} workers exposed MT34-0205 thro -0210 on 6/4/02
2 sp's taken in area X2 MT34-0211, -0212 on 6/5/02
1 jacket submitted from X1 worker
Aerial application on going during same time to broccoli raab on D'Arrigo block 42, approx 3/4 mile NW of workers.

ZABALA VINEYARDS



TWIN PEAKS FARMS

AMARAL RANCHES

TWIN PEAKS FARMS

LOS COCHES
ZABALA VINEYARDS

application site

VENTANA VINEYARDS

incident field site

SECO

THORNE & THORNE CO.

THORNE

FRANSCIONI 7 GRIVA

PEACH

FRANSCIONI & GRIVA

JL WOODS

FRANSCIONI & GRIVA

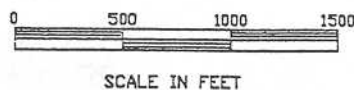
JL WOODS

KLOER VINEYARD

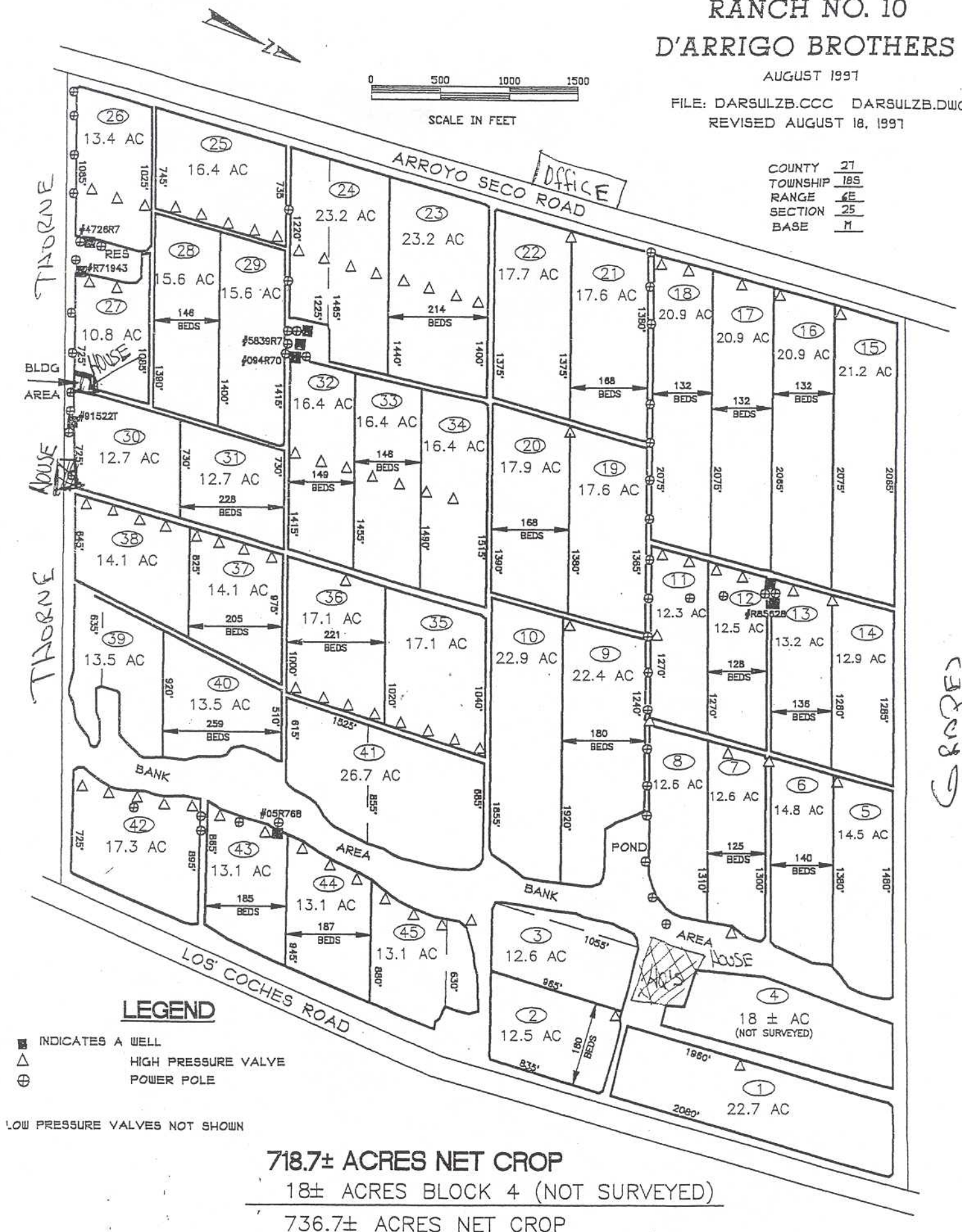
FRANSCIONI 7 GRIVA

D'ARRIGO BROTHERS

FILE: DARSULZB.CCC DARSULZB.DWC
REVISED AUGUST 18, 1997



COUNTY	<u>27</u>
TOWNSHIP	<u>18S</u>
RANGE	<u>6E</u>
SECTION	<u>25</u>
BASE	<u>M</u>



CIMIS (California Irrigation Management Information System)

Hourly Report

Rendered in ENGLISH Units.

June 1, 2002 - June 1, 2002

Printed on June 4, 2002

Arroyo Seco - Monterey Bay - Station 114

Date	Hour	ETo (in)	Precip (in)	Sol Rad (Ly/day)	Vapor Pressure (mBars)	Air Temp (°F)	Rel Hum (%)	Dew Point (° F)	Wind Speed (MPH)	Wind Dir (0- 360)	Soil Temp (°F)
06/01/2002	0100	0.00	0.00	0	13.2	52.8	97	51.9	5.5	349.8	70.8
	0200	0.00	0.00	0	13.1	52.5	97	51.6	4.0	337.8	70.3
	0300	0.00	0.00	0	13.0	52.2	97	51.5	3.5	15.0	69.8
	0400	0.00	0.00	0	13.0	52.3	97	51.6	4.0	357.5	69.3
	0500	0.00	0.00	1	13.0	52.4	97	51.6	5.4	328.1	68.9
	0600	0.00	0.00	69	13.1	52.8	96	51.7	6.5	323.7	68.5
	0700	0.00	0.00	129	13.2	53.8	93	51.8	5.3	318.8	68.1
	0800	0.00	0.00	268	13.3	55.1	90	52.1	4.1	324.3	67.8
	0900	0.00	0.00	419	13.4	56.3	87	52.4	4.7	332.1	67.5
	1000	0.01	0.00	868	13.9	58.9	82	53.3	7.3	319.1	67.3
	1100	0.02	0.00	1786	14.4	62.5	75	54.4	9.9	319.6	67.3
	1200	0.03	0.00	1980	14.7	65.5	69	55.0	10.7	320.8	67.5
	1300	0.03	0.00	1989	14.9	66.5	67	55.3	14.6	320.8	68.1
	1400	0.03	0.00	1877	14.4	65.7	67	54.3	17.3	328.8	69.0
	1500	0.02	0.00	1671	13.8	63.7	69	53.2	18.8	327.5	70.0
	1600	0.02	0.00	1367	13.4	61.8	71	52.3	20.7	327.1	70.8
	1700	0.01	0.00	981	13.1	60.0	74	51.7	20.1	326.7	71.3
	1800	0.01	0.00	567	12.9	57.6	80	51.3	18.7	325.3	71.6
	1900	0.00	0.00	145	12.5	54.7	85	50.4	17.4	330.9	71.6
	2000	0.00	0.00	6	12.3	53.4	88	50.0	14.2	331.4	71.4
	2100	0.00	0.00	0	12.2	52.8	90	49.9	9.5	321.8	71.0
	2200	0.00	0.00	0	12.1	52.4	90	49.6	7.8	306.5	70.5
	2300	0.00	0.00	0	12.0	52.2	90	49.4	8.8	309.6	69.9
	2400	0.00	0.00	0	12.2	52.9	89	49.8	8.5	316.5	69.3
Total/Avg	--	0.18	0.00	588	13.2	56.7	85	51.9	10.3	313.3	69.5
1-day Total/Avg	--	0.18	0.00	588	13.2	56.7	85	51.9	10.3	313.3	69.5